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APPLICATION NO.	FILING DATE	FIRST NAMED INVENTOR	ATTORNEY DOCKET NO.	CONFIRMATION NO.
10/792,244	03/03/2004	David R. Hembree	3592.10US (97-0321.10/US)	3976
24247	7590	01/29/2007	EXAMINER	
TRASK BRITT P.O. BOX 2550 SALT LAKE CITY, UT 84110			MITCHELL, JAMES M	
			ART UNIT	PAPER NUMBER
			2813	

SHORTENED STATUTORY PERIOD OF RESPONSE	MAIL DATE	DELIVERY MODE
3 MONTHS	01/29/2007	PAPER

**Please find below and/or attached an Office communication concerning this application or proceeding.**

If NO period for reply is specified above, the maximum statutory period will apply and will expire 6 MONTHS from the mailing date of this communication.

## Office Action Summary

**Application No.**

10/792,244

**Applicant(s)**

HEMBREE, DAVID R.

**Examiner**

James M. Mitchell

**Art Unit**

2813

-- The MAILING DATE of this communication appears on the cover sheet with the correspondence address --

### Period for Reply

A SHORTENED STATUTORY PERIOD FOR REPLY IS SET TO EXPIRE 3 MONTH(S) OR THIRTY (30) DAYS, WHICHEVER IS LONGER, FROM THE MAILING DATE OF THIS COMMUNICATION.

- Extensions of time may be available under the provisions of 37 CFR 1.136(a). In no event, however, may a reply be timely filed after SIX (6) MONTHS from the mailing date of this communication.
- If NO period for reply is specified above, the maximum statutory period will apply and will expire SIX (6) MONTHS from the mailing date of this communication.
- Failure to reply within the set or extended period for reply will, by statute, cause the application to become ABANDONED (35 U.S.C. § 133). Any reply received by the Office later than three months after the mailing date of this communication, even if timely filed, may reduce any earned patent term adjustment. See 37 CFR 1.704(b).

### Status

- 1) ☒ Responsive to communication(s) filed on 24 October 2006.
- 2a) ☐ This action is **FINAL**.                      2b) ☒ This action is non-final.
- 3) ☐ Since this application is in condition for allowance except for formal matters, prosecution as to the merits is closed in accordance with the practice under *Ex parte Quayle*, 1935 C.D. 11, 453 O.G. 213.

### Disposition of Claims

- 4) ☒ Claim(s) 1-10 is/are pending in the application.
- 4a) Of the above claim(s) \_\_\_\_\_ is/are withdrawn from consideration.
- 5) ☐ Claim(s) \_\_\_\_\_ is/are allowed.
- 6) ☒ Claim(s) 1-10 is/are rejected.
- 7) ☐ Claim(s) \_\_\_\_\_ is/are objected to.
- 8) ☐ Claim(s) \_\_\_\_\_ are subject to restriction and/or election requirement.

### Application Papers

- 9) ☐ The specification is objected to by the Examiner.
- 10) ☐ The drawing(s) filed on \_\_\_\_\_ is/are: a) ☐ accepted or b) ☐ objected to by the Examiner.
- Applicant may not request that any objection to the drawing(s) be held in abeyance. See 37 CFR 1.85(a).
- Replacement drawing sheet(s) including the correction is required if the drawing(s) is objected to. See 37 CFR 1.121(d).
- 11) ☐ The oath or declaration is objected to by the Examiner. Note the attached Office Action or form PTO-152.

### Priority under 35 U.S.C. § 119

- 12) ☐ Acknowledgment is made of a claim for foreign priority under 35 U.S.C. § 119(a)-(d) or (f).
- a) ☐ All    b) ☐ Some \*    c) ☐ None of:
1. ☐ Certified copies of the priority documents have been received.
  2. ☐ Certified copies of the priority documents have been received in Application No. \_\_\_\_\_.
  3. ☐ Copies of the certified copies of the priority documents have been received in this National Stage application from the International Bureau (PCT Rule 17.2(a)).

\* See the attached detailed Office action for a list of the certified copies not received.

### Attachment(s)

- |  |   |
|--|---|
| 1) <input checked="" type="checkbox"/> Notice of References Cited (PTO-892)          | 4) <input type="checkbox"/> Interview Summary (PTO-413)           |
| 2) <input type="checkbox"/> Notice of Draftsperson's Patent Drawing Review (PTO-948) | Paper No(s)/Mail Date. _____                                      |
| 3) <input type="checkbox"/> Information Disclosure Statement(s) (PTO/SB/08)          | 5) <input type="checkbox"/> Notice of Informal Patent Application |
| Paper No(s)/Mail Date _____  | 6) <input type="checkbox"/> Other: _____                          |

### DETAILED ACTION

This office action is in response to applicant's request for continued examination filed October 24, 2006.

#### ***Claim Rejections - 35 USC § 103***

The following is a quotation of 35 U.S.C. 103(a) which forms the basis for all obviousness rejections set forth in this Office action:

(a) A patent may not be obtained though the invention is not identically disclosed or described as set forth in section 102 of this title, if the differences between the subject matter sought to be patented and the prior art are such that the subject matter as a whole would have been obvious at the time the invention was made to a person having ordinary skill in the art to which said subject matter pertains. Patentability shall not be negated by the manner in which the invention was made.

Claims 1, 3, 4, 6, 8 and 9 are rejected under 35 U.S.C. 103(a) as being unpatentable over Mertol (U.S. 6,008,536)<sup>1</sup> in combination with Block et al. (U.S. 5,137,959).

Mertol (Fig. 1, 2) discloses a semiconductor assembly comprising: a substrate (14) having a plurality of circuits (i.e. 24 in contact with balls) on a portion of a surface thereof; a semiconductor die (12) having a plurality of bond pads located on an active surface thereof (i.e. portion in contact with balls) and having a back side surface; a plurality of solder balls (20) connecting at least a portion of the plurality of bond pads of the semiconductor die to at least a portion of the plurality of circuits of the substrate; one of a glob top material and low viscosity polymeric (e.g. "epoxy", 34) filling any space between the substrate and the semiconductor die; an thermal conductive adhesive (36) contacting at least a portion of the back side surface of the semiconductor die; and a heat sink cap (16) having portion thereof contacting a portion of the substrate covering

the interface, the semiconductor die, the plurality of solder balls, and a portion of the substrate free of gaps therewith<sup>2</sup> (e.g. cap attached by adhesive, 40), the heat sink cap having the edge portion (e.g., bottom of cap) substantially contacting the substrate (Fig. 1) and the heat sink contacting at least a portion the interface.

Mertol does not appear to explicitly show that its thermal adhesive is a compliant, adhesive, gel elastomer, cross linked silicone, filled with thermally conductive material.

However, Block utilizes an interface that is a compliant, adhesive, gel elastomer, cross linked silicone, filled with thermally conductive material (Col. 1, Lines 55-65).

It would have been obvious to one of ordinary skill at the time the invention was made to form the adhesive of Mertol<sup>3</sup> with a compliant, adhesive, gel elastomer, cross linked silicone, filled with thermally conductive material in order to improve thermal conductivity as taught by Block (Col. 1, Lines 41-45).

Furthermore Block evidences that the claimed material was known thermal interface material, as such, the selection of the claimed material would have been obvious to one of ordinary skill in the art, since it has been held that the selection of a known material based on its suitability for its intended use supported a prima facie obviousness determination in *Sinclair & Carroll Co. v. Interchemical Corp.*, 325 U.S. 327, 65 USPQ 297 (1945). See, M.P.E.P §2144.07.

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<sup>1</sup> Note that the claimed structure is conventional and that there are numerous references (some additional ones cited) that can be substituted for Mertol.

<sup>2</sup> For examination purposes, understood to mean free of any empty gaps between the cap and substrate.

<sup>3</sup> Mertol only provides some examples of what the interface material may be.

Claims 2, 5, 7 and 10 are rejected under 35 U.S.C. 103(a) as being unpatentable over Mertol (U.S. 6,008,536) and Block et al. (U.S. 5,137,959) as applied to claims 1, 4, 6 and 9 and further in combination with Chia et al. (U.S. 6,225,695).

Neither Mertol nor Block appears to shoe the heat-dissipating member with fins.

Chia teaches the use of fins (Fig 1A).

It would have been obvious to one of ordinary skill in the art to incorporate fins on the heat-dissipating member of Mertol in order to order to provide greater surface area for cooling as taught by Chia (Col. 2, Lines 53-55).

### ***Response to Arguments***

Applicant's arguments with respect to claims have been considered but are moot in view of the new ground(s) of rejection.

### ***Conclusion***

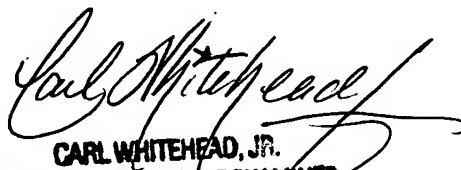
The prior art made of record and not relied upon is considered pertinent to applicant's disclosure. The prior art discloses for example in: Toy et al. (U.S. 5,956,576) and Kim (U.S. 5,552,635) a chip connected to a cap through a thermal interface material with the cap connected to the substrate free from any gaps therewith; Distefano (U.S. 6,075,289) and Kim et al. (U.S. 5,552,635) the use of gels as thermal interface material.

Any inquiry concerning this communication or earlier communications from the examiner should be directed to James M. Mitchell whose telephone number is (571) 272-1931. The examiner can normally be reached on M-F 8:00-4:00.

If attempts to reach the examiner by telephone are unsuccessful, the examiner's supervisor, Carl Whitehead Jr. can be reached on (571) 272-1702. The fax phone number for the organization where this application or proceeding is assigned is 571-273-8300.

Information regarding the status of an application may be obtained from the Patent Application Information Retrieval (PAIR) system. Status information for published applications may be obtained from either Private PAIR or Public PAIR. Status information for unpublished applications is available through Private PAIR only. For more information about the PAIR system, see <http://pair-direct.uspto.gov>. Should you have questions on access to the Private PAIR system, contact the Electronic Business Center (EBC) at 866-217-9197 (toll-free). If you would like assistance from a USPTO Customer Service Representative or access to the automated information system, call 800-786-9199 (IN USA OR CANADA) or 571-272-1000.

  
Ex. Mitchell, J.D.  
January 18, 2007

  
CARL WHITEHEAD, JR.  
SUPERVISORY PATENT EXAMINER  
TECHNOLOGY CENTER 2800